02

DRAFT

FINDING OF NO SIGNIFICANT IMPACT

TO ALL INTERESTED CITIZENS, ORGANIZATIONS, AND GOVERNMENT AGENCIES:

Initial PCB Clean-Up Action in Waukegan Harbor

This determination constitutes a finding by me as Regional Administrator, of no significant impact (FNSI) on a portion of the project intended by the United States Environmental Protection Agency, Region V (USEPA) for remedying existing polychlorinated biphenyl (PCB) contamination of the bottom sediments of Waukegan Harbor, Waukegan, Illinois (Figure A). This finding covers the selection of the proposed method of removal by hydraulic or pneumatic dredging of Harbor sediments, and the construction of a dredged sediment dewatering lagoon. USEPA intends to prepare an Environmental Impact Statement (EIS) on the alternative methods of operation of the dredging equipment and operation of the lagoon. The analysis of alternatives for addressing the PCB contaminated North Ditch and adjacent parking lot areas, and the method of disposal of PCB contaminated North Ditch and adjacent parking lot areas, and the method of disposal of contaminated sediments removed in the course of the project.

The National Environmental Policy Act of 1969, as amended (NEPA) requires all federal agencies to include environmental factors in their decision making process. Pursuant to the mandate of NEPA, the Council on Environmental Quality has adopted regulations at 40 CFR Parts 1500 through 1508 which describe the steps required to comply with the goals and procedures of the Act and which are binding upon all federal agencies. Accordingly, USEPA has applied these regulations in reaching its determination on whether to prepare an EIS on this intended cleanup of the PCB contamination of Waukegan Harbor under the Comprehensive Environmental Response Compensation and Liability Act of 1980 (Superfund).

Pursuant to 40 CFR §1501.4, USEPA has prepared an Environmental Assessment (attachment) which serves as a basis for its determination on the project. As provided at 40 CFR §1508.13 that document is hereby incorporated by reference in its entirety as a part of this FNSI.

USEPA's Environmental Assessment indicates that only one practical, proven technology is available to the agency to employ for the harbor cleanup. That technology is dredging. USEPA has consequently concluded, that an extended discussion in the EIS of alternative methods of cleanup, as opposed to alternative methods of operation of the dredge, would serve no constructive purpose under NEPA. Based upon the analysis contained in the Environmental Assessment, USEPA has determined that no significant adverse environmental impact upon the quality of the human environment will result from the decision to dredge and the attendant necessary construction of the temporary dredged sediment dewatering lagoon. It is USEPA's belief that the decision to dredge rather than resulting in a significant impact, will simply restore the condition of the harbor bottom prior to the deposition of the PCBs into the bottom sediments. As discussed in the Environmental Assessment mitigative measures are available which minimize or eliminate any potential short term, temporary impacts associated with the dredging approach and lagoon siting and construction activity.

40 CFR §1501.4(e) provides that in certain limited circumstances an agency shall make its FNSI available for public review and comment for 30 days before an agency makes its final determination whether to prepare an EIS and before agency action on the project may begin. Generally, these limited circumstances are delineated by agency regulations adopted to supplement the CEQ regulations. USEPA has not yet adopted such regulations to specifically cover Superfund activities. However, it has been USEPA's practice under its own NEPA regulations at 40 CFR §6.400(d) to defer final agency action for 30-days after issuance of a FNSI. Accordingly, in view of this prior practice and because the Waukegan project maybe the first Superfund remedial action to be undertaken in Region V, USEPA will follow 40 CFR § 1501.4(e) and not make its final determination on this FNSI for 30 days from the date of this finding pending public review of the Agency's proposed action. Any comments concerning this preliminary decision should be submitted to Mr. Jack Braun at the letterhead address.

Date

Valdas V. Adamkus
Regional Administrator

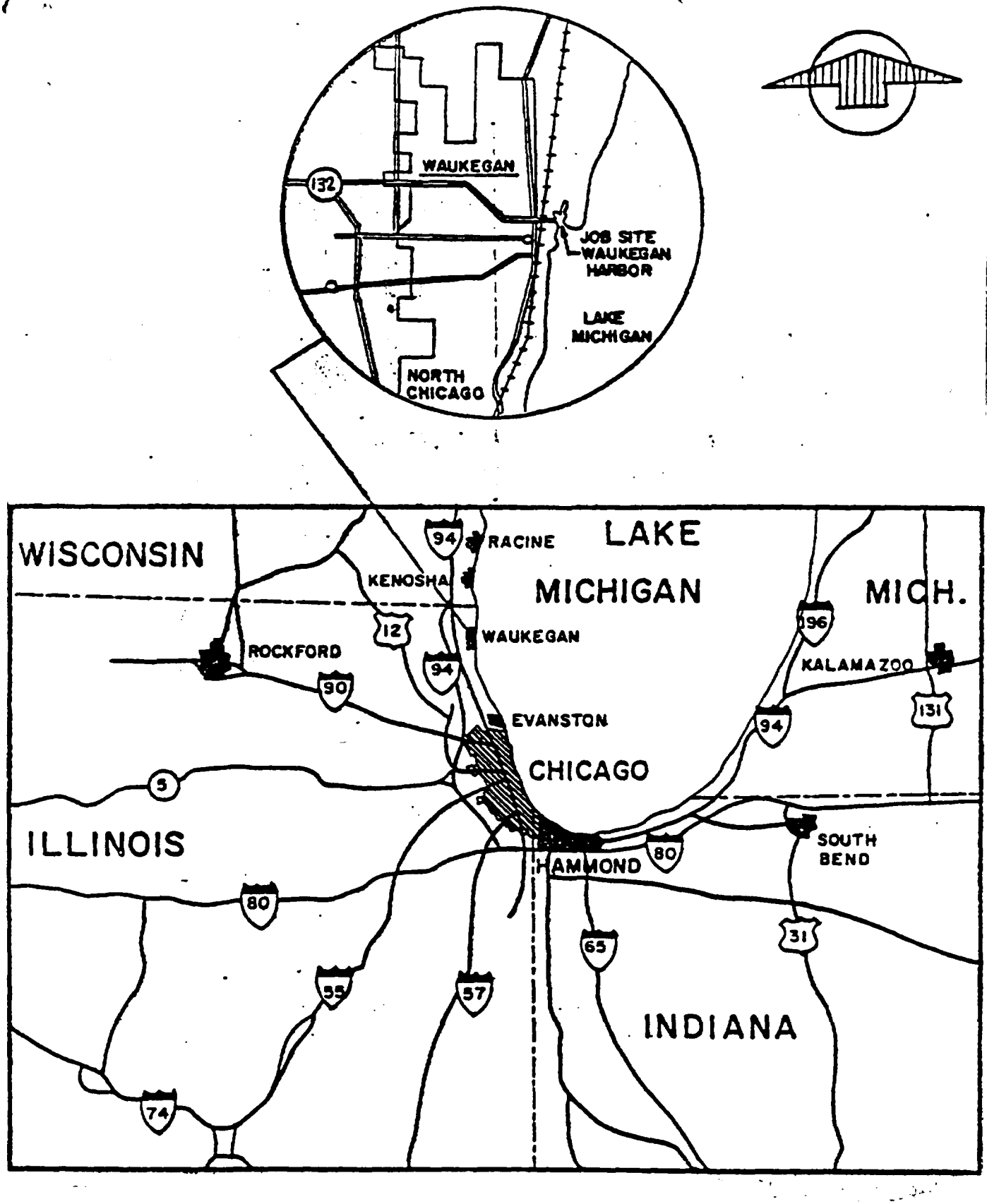


FIGURE A

GENERAL LOCATION MAP

ENVIRONMENTAL ASSESSMENT
FOR ALTERNATIVES TO
ABATE PCB CONTAMINATION
IN WAUKEGAN HARBOR

Prepared by:
U. S. Environmental Protection Agency
Region V

Table of Contents

List of Figures and Tables

ENVIRONMENTAL ASSESSMENT

A. INTRODUCTION

In 1976, high levels of polychlorinated biphenyls (PCBs) were detected in the harbor sediments and soils of Waukegan Harbor and adjacent areas. Three distinct areas of known PCB contamination have now been defined (Mason and Hanger, 1981). These areas are 1) the sediments and water of Waukegan Harbor; 2) in a surface drainage system commonly known as the North Ditch and adjacent soil on the north side of the Outboard Marine Corporation (OMC) property 3) and beneath an OMC parking lot adjacent to the drainage ditch (Figures 1&2). The existence of large quantities of PCBs in these areas represents an immediate as well as a long term threat to Lake Michigan water quality, aquatic life, and public health due to the continous movement of PCBs into the air, water, and subsequently into the food chain.

The contamination apparently resulted from leaks in hydraulic fluid lines in the Johnson Outboard Division aluminum die-casting facility. PCBs that leaked from hydraulic fluid lines ended up in floor drains that discharged directly into the Harbor and the North Ditch. Much of this material has since entered Lake Michigan.

This Environmental Assessment (EA) will serve as the basis for USEPA's proposed determination that removing PCB contaminated sediments from Waukegan Harbor via dredging and the necessary construction of the temporary dewatering lagoon can occur without significantly impacting the quality of the human environment (40 CFR §1501.4).

The remaining segments of the Waukegan Harbor area cleanup program will be addressed in an Environmental Impact Statement (EIS). These include the actual operation of the dredging equipment, operation of the dewatering lagoon, alternative analysis for cleanup of the PCB contaminated North Ditch and adjacent parking lot areas, and the ultimate method of disposal of PCB contaminated material.

The proposed schedule for the NEPA process is as follows:

Draft EIS and FNSI/EA available	November 1981
FNSI comment period closes	December 1981
Public Hearing for Draft EIS	December 1981
Final EIS available	March 1982
Record of Decision	April 1982

Federal action (design and construction) of those aspects of the project addressed in the EIS is not possible until the Record of Decision is published.

The USEPA has been analyzing the PCB contamination problem in Waukegan Harbor for the past five years. During this time, a number of numerous technical reports and data summaries were prepared. These reports and data were used to prepare this EA and are cited in Section I. These documents are available for public review at USEPA's office at 111 West Jackson Boulevard, 16th floor, Chicago, Illinois, Monday through Friday during normal working hours (9:00 AM to 5:00 PM).

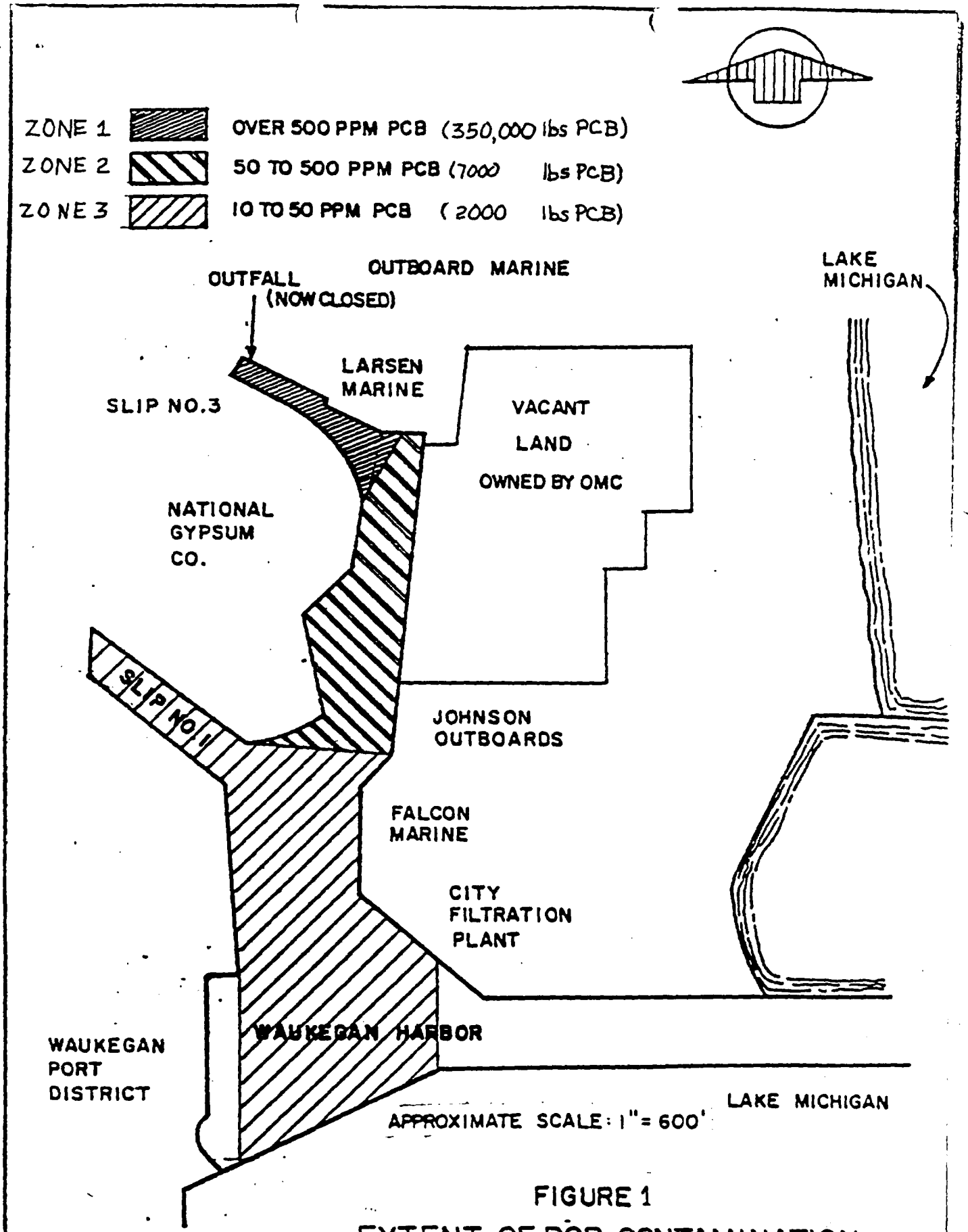


FIGURE 1

EXTENT OF PCB CONTAMINATION IN WAUKEGAN HARBOR BY CONCENTRATION

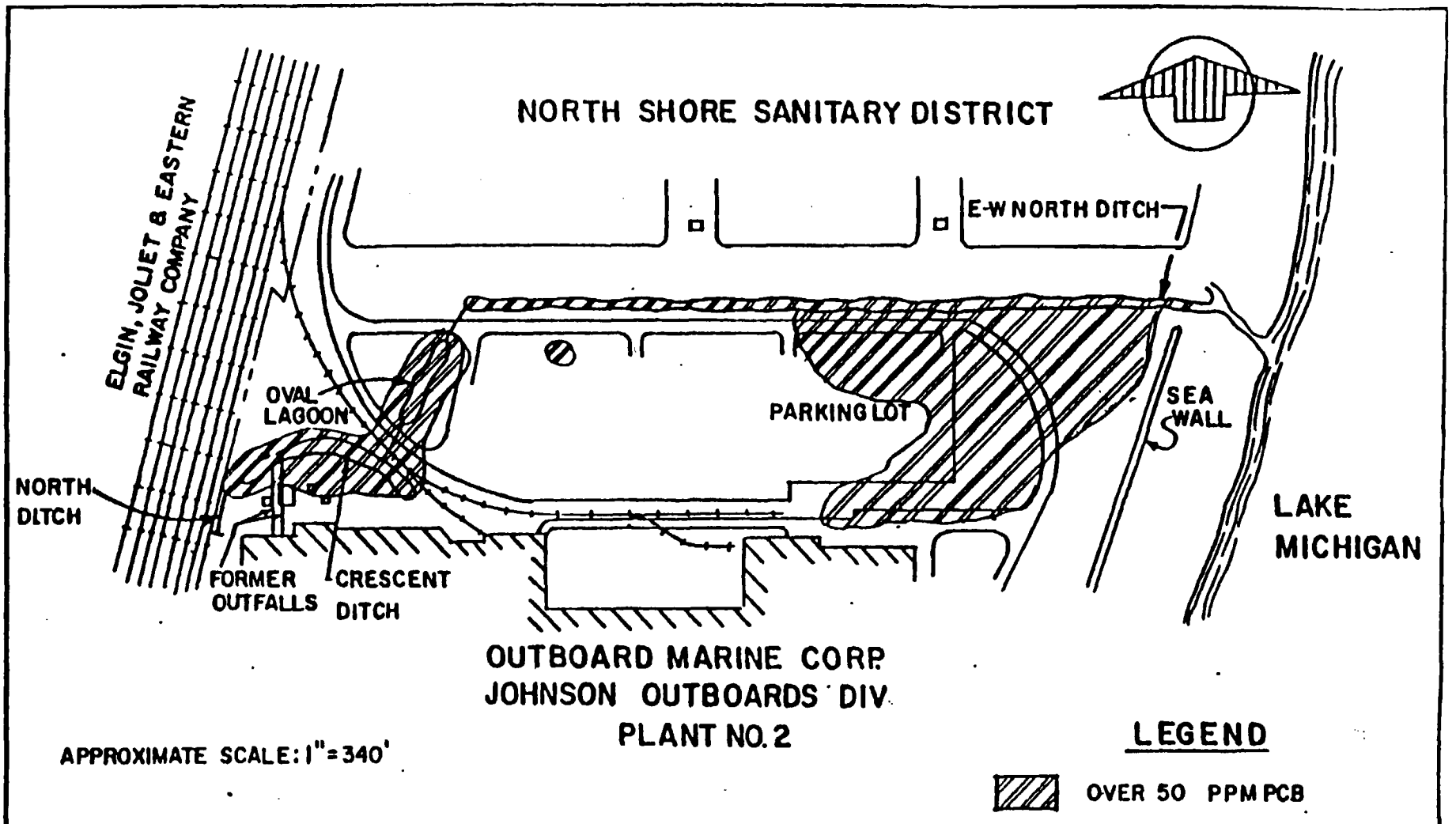


FIGURE 2

NORTH DITCH AREA

EXTENT OF PCB CONTAMINATION

OVER 50 PPM

B. BACKGROUND

Polychlorinated biphenyls (PCBs) are a class of chemical compounds that belong to the broad family of organic chemicals known as chlorinated hydrocarbons. PCBs have been used mainly as fire and pressure resistant hydraulic fluids, as heat transfer fluids, as plasticizers, and in transformers and capacitors. The widespread use of PCBs can be attributed to their unusual chemical properties, such as chemical and thermal stability, fire resistance, low conductivity and low solubility in water. Due to these properties, PCBs do not readily break down when released to the environment. Studies show that PCBs persist for a long period of time and are toxic to both humans and animals. A detailed summary of the properties and uses of PCBs can be found in the National Academy of Sciences 1979 Report on PCBs. A general chronological listing of major events and activities which contributed to the process by which the Waukegan Harbor area contamination was defined and cleanup alternatives evaluated is listed below:

1971	Results of USEPA study show PCB concentrations of 2.7 to 15.0 parts per million (ppm) in Lake Michigan fish.
1971	Monsanto (the major domestic manufacturer of PCBs) restricts sale of PCBs to closed-system use.
1971	Sale of certain species of Lake Michigan fish banned or restricted in Michigan and Wisconsin.
1973	Food and Drug Administration prohibits the interstate transport of fish containing concentrations of PCBs greater than 5 parts per million (ppm).
January 1976	Results of Illinois Environmental Protection Agency (IEPA) analysis of OMC effluent indicates PCB discharges of approximately 9 to 10 pounds per day.
Februray 1976	USEPA and IEPA issue Administrative Enforcement Order requiring OMC to cease PCB discharges.
May 1976-May 1977	USEPA and IEPA collect and analyze sediment samples from Waukegan Harbor and the North Ditch. PCB concentrations in the Harbor sediments as high as 186,000 ppm are noted.
May 1976	USEPA recommends that the US Army Corps of Engineers not perform scheduled dredging of Waukegan Harbor. The Corps of Engineers concurs.
1976	Congress enacts Toxic Substance Control Act. Manufacture of PCBs is barred and use is ended except for use in closed systems.
1977	Monsanto voluntarily terminates domestic production of PCBs.
April-July 1977	USEPA reviews preliminary environmental and engineering analyses conducted by OMC's consultants.
March 1, 1978	OMC files suit against USEPA alleging that it is the responsibility of the United States to determine if cleanup should be conducted in Waukegan and to pay for any such cleanup.

March 17, 1978	U.S. District Attorney on behalf of USEPA files suit against OMC. The suit alleges that PCB discharges made by OMC have harmed Lake Michigan water and aquatic life and that they pose a threat to public health and the environment.
June-November 1978	USEPA conducts preliminary evaluation of alternatives assessment for removal/destruction of PCB contaminated sediments in the Harbor and North Ditch.
December 1978 - February 1981	USEPA conducts studies to assess the nature and extent of environmental problems in air, surface water, groundwater, soils, and sediments of Waukegan Harbor and North Ditch areas and southern Lake Michigan
November 1979	The Regional Response Team (RRT), a regional planning body made up of Federal, State and local agencies convened to coordinate the activities of those agenices during an uncontrolled pollution discharge (40 CFR 1510.34), determined that a remedial action was necessary pursuant to the emergency provisions of Section 311 of the Clean Water Act. The RRT recommended that a bypass be constructed around the North Ditch.
December 1979-January 1980	During site preparation for construction of the bypass, USEPA discovers new areas of substanial PCB contamination along the proposed path of North Ditch bypass and beneath OMC's North parking lot. Bypass construction is postponed.
July 1980	USEPA conducts soil sampling to locate possible zones of PCB contamination elsewhere on OMC's property.
July 1980	USEPA begins updating preliminary alternatives assessment and identifying ultimate disposal and/or destruction alternatives, for Waukegan Harbor, North Ditch and parking lot areas of contamination.
September 1980	Special Congressional appropriation of $1.5 million in USEPA budget made to begin cleanup of Waukegan Habor.
October 1980	RRT is again convened and presented with available Harbor data. RRT determines that a limited remedial action is necessary pursuant to emergency provisions under Section 311 of the Clean Water Act. Based on available data, the RRT cites the urgent need to abate the ongoing uncontrolled release of PCBs from the sediment to Waukegan Harbor and Lake Michigan.

	The RRT, with the assistance of USEPA, evaluates feasible alternatives for Harbor remedial action and determines that dredging of the northern most areas of the Harbor should be undertaken as soon as detailed plans and specifications can be readied. USEPA beings preparation of these plans and specifications.
November 1980	USEPA issues a public statement which describes the proposed dredging plan and requests comments from the public.
December 1980	The Comprehensive Enironmental Response, Compensation, and Liability Act of 1980 (Superfund) is passed by Congress. Congress authorizes $1.6 billion for five years to pay for costs of cleanup of hazardous substances released into the environment.
January 1981	USEPA completes preliminary remedial action alternatives assessment for abatement of PCB contamination in Waukegan Harbor, North Ditch and Parking lot areas.
January 1981	USEPA issues a public report which discusses in detail a proposal for a comprehensive, feasible remedial cleanup project for Waukegan Harbor, North Ditch and parking lot areas. Potential funding sources are identified. Public comments are requested.
January 1981	USEPA holds a public meeting in Waukegan to solicit comments on the proposed cleanup project.
February 1981	USEPA begins preparation of a detailed environmental assessment of the proposed project using all available information and data.
April 1981-July 1981	USEPA Region V determines that, if Superfund dollars are to be used, requirements of the National Environmental Policy Act must be satisfied.
June 1981	An Environmental Assessment will be prepared to consider the issues associated with the selection of dredging as the alternative in the abatement of the Waukegan Harbor contamination problem and the construction of the necessary dewatering lagoon. An EIS will address the other aspects of the proposed cleanup project.
July 31, 1981	USEPA publishes a Notice of Intent in the Federal Register to prepare an EIS on the cleanup of Waukegan Harbor, the North Ditch, OMC parking lot and removal, transportation and ultimate disposal of contaminated materials.
August 21, 1981	USEPA holds a public scoping meeting to surface issues of concern which must be addressed in the Draft EIS (40 CFR 1501.7).

C. PURPOSE AND NEED FOR ACTION

USEPA has estimated that Waukegan Harbor sediments have been contaminated with approximately 359,000 pounds of PCBs (Figure 1) (Mason and Hanger 1981). The Harbor waters and sediments act as on-going discharges of PCBs to Lake Michigan and continual sources of food chain contamination (Hydroqual 1981). Such discharges and sources will continue to adversely affect Harbor and nearshore ecosystems and threaten public health until removed.

Aquatic Life

A variety of fish reside in or frequent Waukegan Harbor including yellow perch, alewife, bass and carp. Studies of whole fish found in the Harbor indicate very high levels of PCBs, some exceeding 100 ppm. Even through reduced, PCB concentrations for filets are expected to be in excess of the U.S. Food and Drug Administration (FDA) tolerance level of 5 ppm for the edible portion (USEPA 1978, 1979, 1980).

The PCB contamination in Waukegan Harbor is presently inhibiting phytoplankton (small aquatic plants) photosynthesis (reproduction) and ultimately phytoplankton growth by as much as 18% (McNaught 1981). As phytoplankton forms the base of the food chain in Lake Michigan, the reproduction of phytoplankton ultimately determines the size of the fish population which the Lake system can support. Therefore, fish populations located near Waukegan Harbor may be adversely impacted by Harbor PCB contamination.

Surface Water

If no action is taken, Waukegan Harbor will continue to flush PCBs into Lake Michigan. The long term average PCB mass load to Lake Michigan has been estimated to be approximately 22 pounds per year (HydroQual 1981). This discharge has been projected to continue for an extended period of time.

OMC Discharges

Withdrawal of Slip #3 water by OMC for cooling during 1977-1979 resulted in approximately 6.5 pounds per year of PCBs entering the plant. In consequence and as a result of prior contamination, approximately 4 pounds per year entered Lake Michigan and 2 pounds per year of more entered the North Ditch.

Air quality

The air quality in the Waukegan Harbor area may be impacted due to volitilization of PCB to the atmosphere from the contaminated portions of the Harbor, North Ditch, and parking lot. The present calculated rate of release of PCBs into the atmosphere from the contamination of Waukegan Harbor water has been estimated to be approximately 3 pounds per month (Mason and Hanger 1981).

Drinking Water

The Waukegan Water Treatment Plant currently maintains a back up or emergency water intake in the Harbor mouth area. This intake is used for a maximum of a few days during infrequent years when the principal offshore crib is iced up or under repair. If the PCB contaminated sediments remain in place the water taken from the emergency intake is subject to the threat of PCB contamination.

Although USEPA's investigations have not demonstrated a problem to date, there remains a potential for storm driven currents to transport significant amounts of undiluted PCB contaminated water from Waukegan Harbor to Waukegan's off shore drinking water intake.

Recreational Impacts

Scuba divers who wish to use the Harbor cannot due to increased risk of increased exposure. Storm driven currents could also affect the public beach directly east of Waukegan Harbor. Such currents could deposit PCB contaminated sediments in the beach area causing the public to come in contact with PCB contamination on a more frequent basis.

Economic Impacts

At USEPA's request, the US Army Corps of Engineer, (COE) has ceased routine dredging of the navigation channel of Waukegan Harbor in order to minimize PCB transport into Lake Michigan.

If no action is taken to cleanup Waukegan Harbor navigation dredging could be postponed indefinitely. Shipping activity in Waukegan Harbor will soon be severely curtailed since sedimentation at the Harbor mouth is presently restricting free passage of large ships into the Harbor. This will severely impact the ability of Huron Cement and National Gypsum to remain in business because these industries utilize the Harbor almost exclusively to receive their raw material shipments. In additional, access by smaller boats to the nothern most areas of the Harbor and Slip #3 may also become restricted unless dredging can be conducted.

For the above reasons, USEPA has decided that action to abate the PCB contamination problem in the Harbor and adjacent areas must be undertake on the shortest possible time schedule.

D. CONCEPTUAL ALTERNATIVES EVALUATION

A wide range of alternatives for abatement of PCB contamination problem in the Harbor were evaluated based upon engineering practicality, demonstrated effectiveness, socioeconomic impact, and environmental impact (Mason and Hanger 1981, Batelle 1978). The alternatives evaluated and EPA's methodology for accepting or rejecting the conceptual alternatives is discussed below. EPA has concluded based upon this review that unproven methodologies or those which were infeasible either technically or logistically are not appropriate for the handling of hazardous PCB contaminated materials.

No Action

The no action alternative would include measures to mitigate the harmful effects of the contaminated Harbor sediments such as bans on fishing in Waukegan Harbor bans on dredging in the Harbor and restrictions on boat traffic. However, these measure would not reduce the extent of contamination or prevent it from continuing to migrate to Lake Michgan and through the food chain. Fish residing or frequenting the Harbor will still be contaminated with PCB to levels in excess of the FDA tolerance level of 5 ppm. Twenty two pounds of PCBs would be discharge annually to Lake Michigan from the Harbor and additional PCBs through OMC outfalls. Sedimentation of the Harbor mouth would prevent the entrance of large ships into the Harbor, severely impacting the ability of industries to receive raw materials via the Harbor. The City of Waukegan's emergency drinking water intake located near the Harbor mouth would be subject to the continued threat of PCB contamination. For these reasons, the no action alternative was not considered a viable alternative for abatement of the PCB contamination problem in Waukegan Harbor.

Closing the Harbor

In this alternative, a permanent dam would be installed across a significant part of the Harbor. The dam would prevent surface water movement of PCBs into Lake Michigan and prevent fish from entering the enclosed area of the Harbor.

Under this alternative, a heavly used section Waukegan Harbor would be permanently lost thereby adversely impacting the economy, recreational resources, aesthethics, and quality of life in the City of Waukegan as well as impacting non-local uses of the Harbor. Additionally, PCBs would continue to migrate from areas of high contamination into adjacent soils and groundwater. Long-term monitoring of the integrity of the site and mitigation of any detected losses from the site would be very difficult.

Permanent Harbor closure is considered unacceptable by USEPA due to the adverse environmental, social, recreational, and socioeconomic impacts briefly outlined above.

Draining the Harbor/Excavation

This alternative would consist of the installation of a temporary dam across part of the Harbor. The water behind the dam would be pumped through a treatment system to remove PCBs and then discharged to Lake Michigan. Contaminated sediments would be removed by excavation and disposed of at an appropriate facility. The dam would then be removed and the Harbor returned to normal use.

If water were drained from the Harbor, sheet piling and the adjacent shoreline areas can be expected to cave-in. To prevent this, a slurry wall and other shoreline retaining devices would have to be built around the entire perimeter of the Harbor that is to be drained. Well points would have to be installed around the perimeter to prevent groundwater from refilling the Harbor. Removing groundwater could cause foundations of nearby buildings to weaken causing foundations to shift, sink or heave.

This alternative would result in the loss of use of critical areas of the Harbor for at least a year. Waukegan Harbor is an important harbor of refuge on Lake Michigan and has considerable recreational, commercial and industrial importance. Closure for any length of time would cause irreversible economic hardships to the local businesses and industries. The potential for severe economic and recreational impacts make this alternative unacceptable.

In-Place Confinement

In-place confinement, sometimes referred to as encapsulation, would consist of sealing off a section of the northern end of the Harbor including Slip No. 3 with a permanent dam-like structure. Contaminated materials to be removed from the Harbor would be placed behind the dam. Overflow water would be treated for PCBs prior to return to the Harbor. A clay slurry wall would be constructed around the enclosed area of the Harbor. The slurry wall would extend down into the natural clay layers below to attempt to seal off horizontal groundwater flow. Finally, the sediments inside the enclosure would be chemically fixed to solidify or aggregate them, and the entire area would be covered with clay and soil.

Under this alternative, the northern part of the Harbor would be permanently lost for navigation or recreational use. The northern part of the Harbor would in fact become a permanent PCB waste-disposal site. However, such a site by its nature would not meet EPA's PCB land disposal requirements set forth at 40 CFR § 761.41. Permanent loss of that portion of the Harbor would also have a severe adverse economic impact on Larsen Marine a pleasure boating industry located in close proximity to Slip No. 3 in Waukegan Harbor.

In-place confinement relies on the natural clay bottom of the Harbor to form the bottom lining of the disposal site. It is not possible to ensure the integrity of the natural clay layers (thickness, permeability, uniformity of properties, and inclusion of permeable layers) for long-term containment of PCBs. It would also be very difficult to monitor PCB movement or to collect leachate from the site because of the high groundwater elevations. Although a slurry wall can be used effectively to temporarily reduce the movement of groundwater for construction purposes, the device has only been used for permanent secure disposal of hazardous wastes where other alternatives were considered infeasible. The walls must be installed in the ground without being able to inspect their structural integrity, raising critical uncertainties in their long term use. There is little, if any, previous experience with establishing operating and monitoring procedures for a secure hazardous waste disposal site with essentially all of it below the groundwater table. Placing a hazardous waste site in the middle of a recreational area would have severe adverse social, aesthetic, and economic impacts.

In-place confinement was therefore not considered by the USEPA as an acceptable alternative for the Waukegan Harbor cleanup project.

In-Place Fixation of Contaminated Harbor Sediments

Chemical fixation techniques have been used in reducing the hazards associated with contaminated sludge and soil wastes by physically or chemically binding the contaminants and reducing their rate of transfer to the natural environment. Potential fixing agents include portland cement, lime, sodium silicate, and certain polymers. The fixation agents are mixed or injected into the material. Depending upon the process, the waste characteristic and the proportion of fixation agent used, the end product can vary from the consistency of soil to loose aggregate to concrete (Pojasek, 1979).

A Japanese Company has developed a process for in place stabilization of contaminated sediments (Mason & Hanger 1981). The process, used in Japan in 1973, involves pumping a slurry of portland cement and proprietary additives through a pipe into the contaminated sediments. This is done at closely spaced intervals until the entire sediment bed becomes a series of vertical columns of stabilized material standing side by side.

For maximum effectiveness, this process requires that the fixation additives be thoroughly and uniformly mixed or injected so as to come in contact with all of the contaminated sediment or soil. It would be very difficult to achieve this uniform mixing in Waukegan Harbor. Therefore the contaminated bottom sediments must be removed before fixation could be used.

Long-term stability of fixed sediment has not been adequately demonstrated since the Japanese process has only been in use since 1973. All of the drawbacks related to the long-term integrity, monitoring and mitigation noted previously for the in-place confinement alternative would also apply to in-place fixation. In-place fixation would also result in the bottom of the Harbor becoming a permanent PCB disposal site which could not be approved under 40 CFR § 761.41. Injection of fixation material into bottom sediments would also increase sediment volume, thereby decreasing Harbor depth and hindering navigation. Unfortunately,future maintenance dredging or navigation improvements would not be possible because such activities would disturb the integrity of the bottom aggregate. The consequent impact on navigation resulting from unabated sediment build up would ultimately cause severe economic hardship to the recreation and commerial industries dependent on the Harbor.

Biological Methods

There are available some applications of biological agents, microbes and worms to destroy PCBs (Mason & Hanger 1981; USEPA 12/2/80; USEPA 1/16/81). However, these have been confined to controlled conditions in laboratories or pilot plant operations. The processes have not been demonstrated in a full-scale field environment where the dissolved oxygen, temperature, and nutrient requirements of the organisms would be very difficult to control, where the organisms would be subject to predation and competition from indigenous species and where deep sediment contamination would require dispersing the organisms throughout the entire Harbor at all depths of contamination. The organisms would have to provide uniform effectiveness throughout the Harbor so as to not leave areas of unconsumed PCBs.

Application of such an approach in Waukegan Harbor would require organisms to degrade all types of PCBs including the most highly chlorinated PCB isomers which are very resistant to degradation and have the potential for producing harmful byproducts. To be environmentally sound and to avoid future public health threats, the organism

must not enter the food chain and allow PCBs to accumulate in fish and also must not adversely disturb the ecology of the area. If biological destruction was to be successful, sediments would have to be removed from the Harbor prior to applying the biological organisms to the sediment. The insurmountable technical problems, uncertainty for success and high potential for adverse environmental impacts, in-place biological destruction is an undesirable alternative at this time.

Chemical Methods

There are a number of chemical methods that have been successfully applied to the destruction of PCBs in pure form or in transformers or waste oils (e.g. SunOhio, Goodyear). These methods are not adaptable to destruction of PCBs in contaminated, wet soils or sludges nor can they be used to destroy PCBs in-place. These methods would require that the PCBs be extracted by an organic solvent or steam and then a destruction method applied to the extract. In-place extraction has not been demonstrated on the scale that would be needed for the Harbor. Additionally, the extraction process could have severe environmental consequence, in terms of biological impacts, because PCBs would be liberated in large part from the sediments and probably exposed to the atmosphere, surface water and groundwater in much larger concentrations than existing under Harbor conditions. In addition, the solvents which would likely be used are explosive, a fire hazard, and often classified as a hazardous substance. As was true for in-place fixation and in-place biological destruction, prior removal of the contaminated Harbor sediments would be required if there were to be any chance for success using chemical extraction.

In-place chemical destruction is therefore not a viable alternative because the necessary chemical extraction process has severe technical and environmental problems which would be insurmountable in the Waukegan Harbor situation.

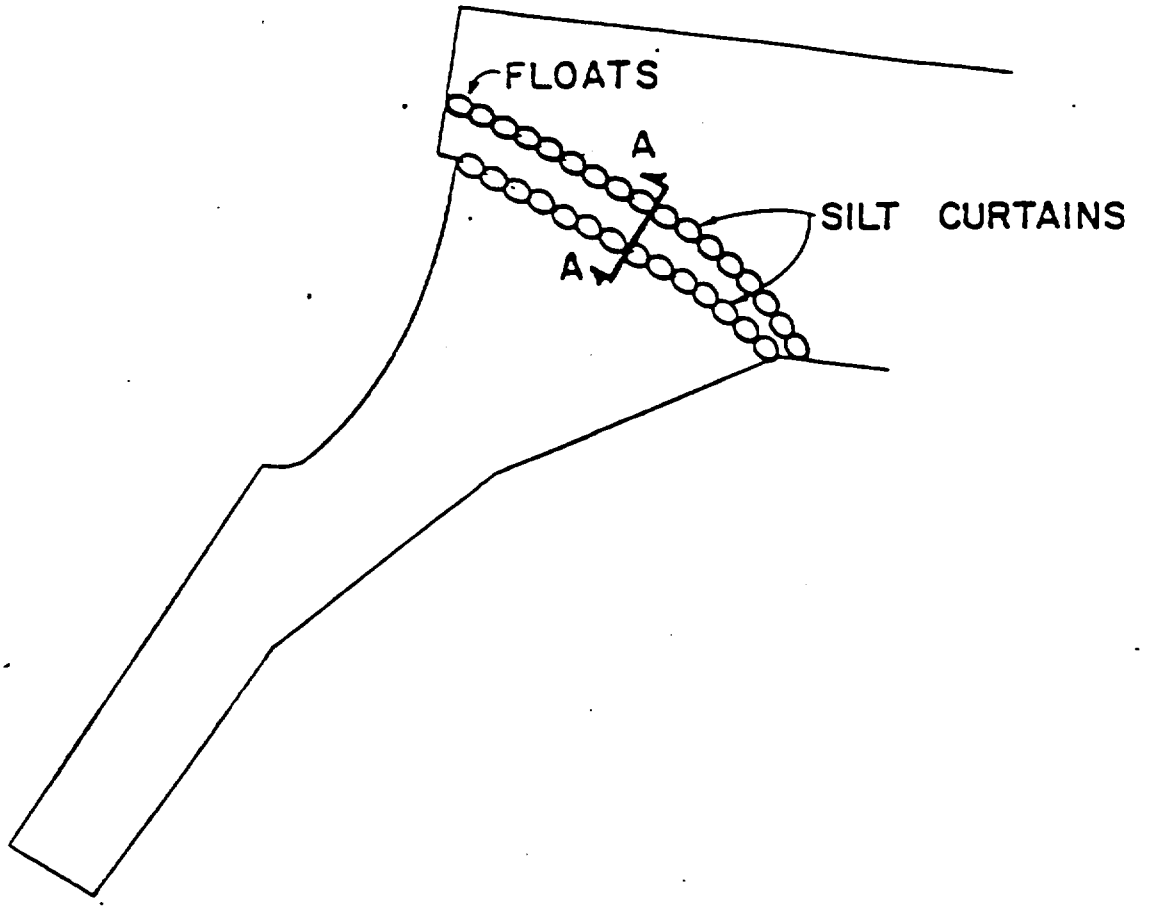
Removal of the Sediments Through Dredging

This alternative would consist of removing the contaminated sediments from the bottom of the Harbor using a dredge. If necessary the sediments would be dewatered in a temporary basin or lagoon. The sediments would then be transported to an ultimate disposal site for confinement or incineration. Dredging is a proven alternative for removing contaminated or undesirable material from water bodies. There can be adverse environmental impacts from dredging; however, well known and proven mitigative techniques and equipment are available to minimize them.

Sediments can be resuspended while dredging, resulting in the possibility of dispersal of contaminants to the water column and possible transport of the contaminants to uncontaminated areas. This resuspension and dispersal can be minimized by the appropriate choice of dredging equipment and by employing silt curtains around the area being dredged (Barnard 1978).

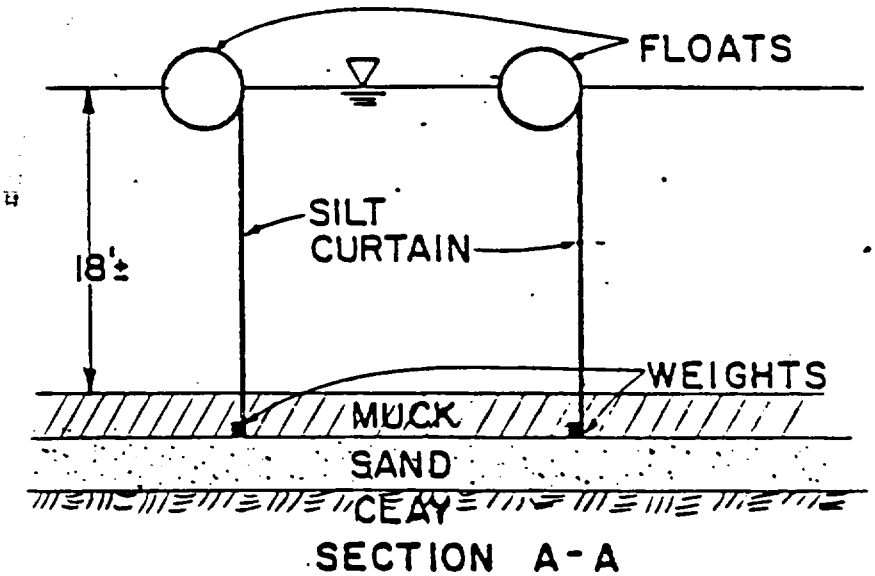
Silt curtains are fabric sheets that are weighted at the bottom and have flotation pontoons at the top. A diagram of a silt curtain plan is shown in Figure 3. These are deployed around the area being dredged to restrict the movement of resuspended sediments. Horizontal movement of the resuspended sediments is limited by the curtain, allowing a greater proportion of the disturbed sediments to settle inside the silt curtain area rather than being transported beyond it. Silt curtains are a practical, effective tool for turbidity control under low current speed conditions which are typical of Waukegan Harbor.

The three basic types of dredges applicable to the Harbor project are mechanical, hydraulic, and pneumatic dredges.



PLAN OF SILT CURTAINS-SLIP 3 DREDGING

NO SCALE.



SECTION A-A

ELEVATION OF DUAL CURTAIN

NO SCALE

FIGURE 3 : SILT CURTAIN PLAN & ELEVATION

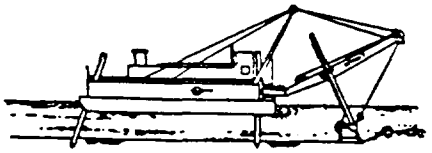
Mechanical Dredges

These include clamshell, dipper, dragline, and continous bucket dredges (Figure 4). All of these use a mechanical digging mechanism to scoop up the bottom sediments and bring them to the water surface to deposit in a lagoon, barge, or truck, depending upon the consistency of the dredged material. Mechanical dredges cause a great deal of disturbance and suspension of bottom sediments when the digging mechanism enters the sediments. As the bucket or scoop is lifted, a considerable portion of the material is washed out as the bucket is lifted from the water and swung over the lagoon, truck or barge.

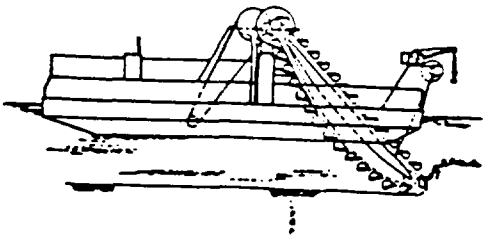
Some of the losses during lifting and swinging can be mitigated by using a water-tight bucket. However, large debris, which are frequently encountered on harbor bottoms, can be caught in the jaws resulting in incomplete closure and partial or total loss of the material being lifted. Another problem is the lack of positive control to determine how deep or where the dredge is digging, particularly for the clamshell dredge, which would be the most suitable of the mechanical dredges. The bucket free-falls to the bottom of the body of water, producing a variable depth of digging ("cut") depending upon the consistency of the material and the amount of free-fall. It is very difficult to drop the bucket so it overlaps the bite of the previous cut. This results in small areas being dredged twice and others missed entirely. In uncontaminated material, the dredge operator drags the bucket at a fixed depth to level the areas missed by the bucket. In the highly contaminated sediments of Waukegan Harbor, this would be undesirable because of the need to capture as much of the contaminated sediment as possible.

Hydraulic Dredges

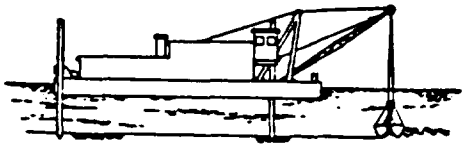
These dredges use a suction line, a centrifugal suction pump, and a discharge line which floats on a series of pontoon floats (Figure 4). The sediments and some additional bottom water needed to allow the mixture to flow properly are sucked up by the pump and conveyed directly to the disposal site by the discharge pipeline. Resuspension and subsequent loss of PCB contaminated sediments is considerably less than with the mechanical dredges since resuspended material also tends to be sucked up by the dredge rather than dispersing into the water column. This resuspension can be further minimized by properly selecting the location and shape of the suction mouth. The typical hydraulic dredge has the suction mouth mounted on a rigid "ladder" structure which is lowered or raised to the desired depth of the cut. The ladder which is mounted on a ship's hull is usually swung on winches and wire ropes anchored to shore or to the bottom in an arc around a piling-like "spud" which is lowered into the bottom sediments from the hull. Rather than pivoting around a spud, some dredges such as the dust pan dredge have a horizontally elongated intake mouth or box and are moved forward or backward. This allows a very precise positioning of the suction mouth and control over the depth of the cut. If the material to be dredged is consolidated, a cutter head may be necessary to dislodge and slurry the sediments. The cutter can produce increased turbidity, but this can be minimized by proper selection of cutter rotation speed, suction velocity and rate of swing or advance of the dredge. There are also shrouded cutters available that tend to contain any resuspended sediments near the suction mouth for pick up (Barnard 1978).



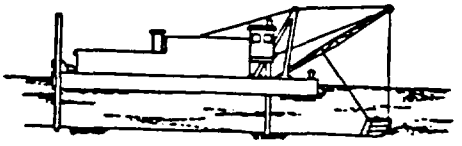
DIPPER DREDGE



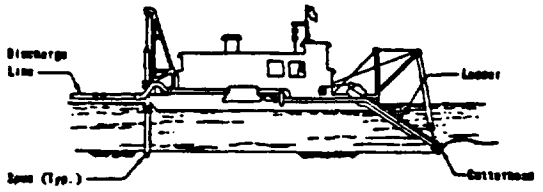
BUCKET DREDGE



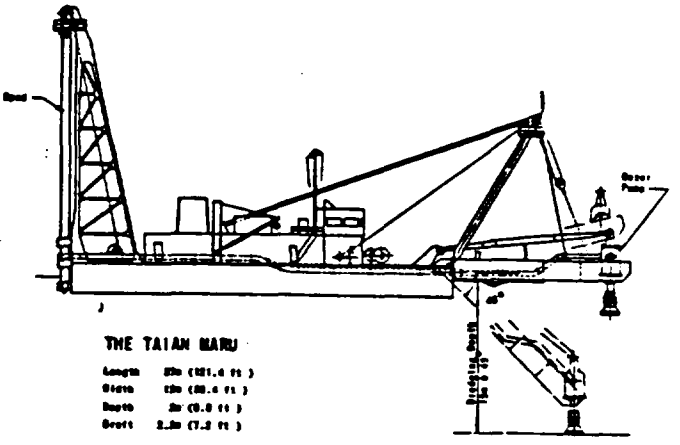
CLAMSHELL DREDGE

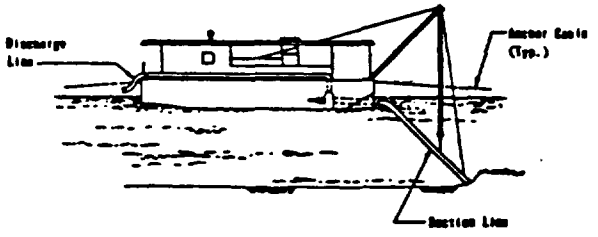


DRAGLINE DREDGE

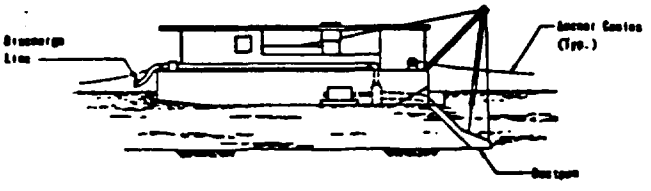


CUTTERHEAD SUCTION DREDGE

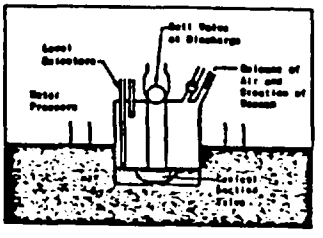


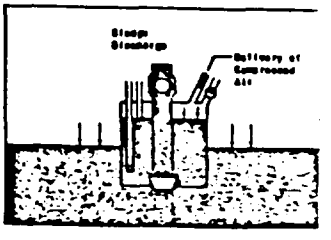


PLAIN SUCTION DREDGE



DUSTPAN DREDGE





The Japanese Pneumatic Dredge Taian Maru.

Figure 4. Examples of Mechanical, Hydraulic, and Pneumatic Dredges.

Source: Malcolm Pirnie, Inc.

Pneumatic Dredges

This type of dredge uses hydrostatic pressure to fill submerged chambers with sediment and then compressed air to force the sediments up the discharge line to the surface and through a floating discharge line (Figure 4). A typical pneumatic dredge has a dredge head consisting of two or more large steel chambers with a sediment intake opening at the bottom end. Each chamber has two pipes entering the top, one for removing the sediment-water mixture and another for introducing and releasing compressed air. When the dredge head is lowered to the bottom, the force of the water column outside (hydrostatic pressure) the dredge head, with a vacuum applied to the chamber, forces the sediments and water through an inlet pipe. When the chamber is full the valve is closed and compressed air is introduced through a valve at the top of the chamber. Air pressure acts as a piston to force the sediment and water through the discharge pipe. When the chamber is empty the compressed air line is vented to the atmosphere, beginning the cycle again. The penumatic dredge can potentially move the dredged material without as much extra slurry water as needed by the hydraulic dredge. In addition, under proper operating conditions, the pneumatic dredge can also control resuspension of contaminated sediments more effectively than mechanical or hydraulic dredges. However, there may be increased volatilization of PCB to the atmosphere due to compressed air coming in contact with PCB contamination and then released to the atmosphere through the discharge line. The pneumatic dredge head can be placed on a ladder and hull like the hydraulic dredge to effect positive positioning. The pneumatic dredge would be somewhat less effective in sand.

Evaluation of Dredging Techniques

The USEPA has determined that mechanical dredging is not a viable technique for removing PCB contaminated sediments from Waukegan Harbor due to the serious problems associated with mechanical dredging, principally the uncontrolled resuspension and subsequent loss of PCB contaminated sediment and lack of accuracy in the cut.

Because hydraulic and pneumatic dredging are proven removal techniques which accurately remove sediments and minimize resuspension and subsequent loss of PCB contaminated sediment, USEPA has determined that either technique would be viable for removing contaminated sediments from Waukegan Harbor.

Both the hydraulic, and pneumatic dredges withdraw excess water along with the sediments when dredging. Therefore, to minimize costs, it would be necessary to dewater the sediments before disposing of them. A temporary lagoon or pond is the only proven method available for dewatering large quantities of dredged materials. The lagoon would provide for settling of the sediments pumped from the dredge and the overlying water would be drawn off, treated to remove remaining contaminants, and discharged to the harbor. Additional discussion of the lagoon operation is provided in the Draft EIS.

In order to further reduce disposal costs and to mitigate any adverse environmental impact, the dewatering lagoon should be placed as close to the ongoing dredging activities as possible. There are two vacant parcels of land near Waukegan Harbor which could accomodate a dewatering lagoon and treatment facility. One site is the vacant OMC property adjacent to the east side of the Harbor (Figure 5). An alternative site for the dewatering lagoon is the vacant land west of the railroad tracks and northwest of the Harbor (Figure 5). If the land west of the railroad tracks was used there would be serious engineering feasibility and environmental problems to overcome. The dewatering lagoon would be located approximately 1/2 mile from the nearest point of Harbor access. A pipeline transport system would be needed to move dredged materials across a public roadway, across railroad tracks and through private property and the risk of pipe failure and leakage to the environment is therefore increased. The increased cost and potential environmental problems associated with transport of dredged materials to the alternate site make it the less preferred option. Because of the convenience and safety and cost advantages of building the lagoon as close as possible to the Harbor, it is recommended that if a dredging project is undertaken that the dewatering lagoon and treatment plant be constructed on the vacant OMC property. The siting of the dewatering lagoon on the vacant OMC property would not be incompatible with adjacent industrial land uses and its construction would use common materials and construction techniques. Any environmental impacts would be short term, insignificant and easily mitigated, as would be expected for any routine construction project.

E. Selection of the Preferred Alternative

After evaluating the conceptual alternatives including no action, USEPA has selected removal by dredging as its preferred alternative to abate or mitigate the Waukegan Harbor PCB contamination problem. USEPA has further determined that dredging should be accomplished using a hydraulic or pneumatic dredge, and the necessary dewatering lagoon be constructed on OMC's vacant property adjacent to the Harbor (Figure 6).

The selected alternative is the only alternative which has all of the following characteristics: 1) is a proven technique for which there is an extensive amount of experience in both its operation and in mitigating any adverse environmental impact; 2) results in cleanup rather than containment, thereby insuring long term environmental benefit; 3) is practicable and technically feasible; 4) returns the Harbor to full commercial and recreational use and 5) allows for future maintenance of and expansion in the Harbor. In addition, the selected alternative will provide a permanent and adequate reduction in the transfer of PCB contamination to aquatic life, the surface waters of Lake Michigan and the atmosphere thereby abating the environmental and public health threat posed by the Harbor contamination.

F. Description of the Proposed Project

Extent of Removal

The USEPA has examined the levels and distribution of PCB contamination in Waukegan Harbor (Figure 1) and has considered all relevant technical and environmental information available which would lead to a decision on an environmentally adequate yet economically reasonable level of cleanup in Waukegan Harbor. Out of this effort several important facts emerge which contribute to an ultimate decision on the extent of removal of the contaminated sediments.

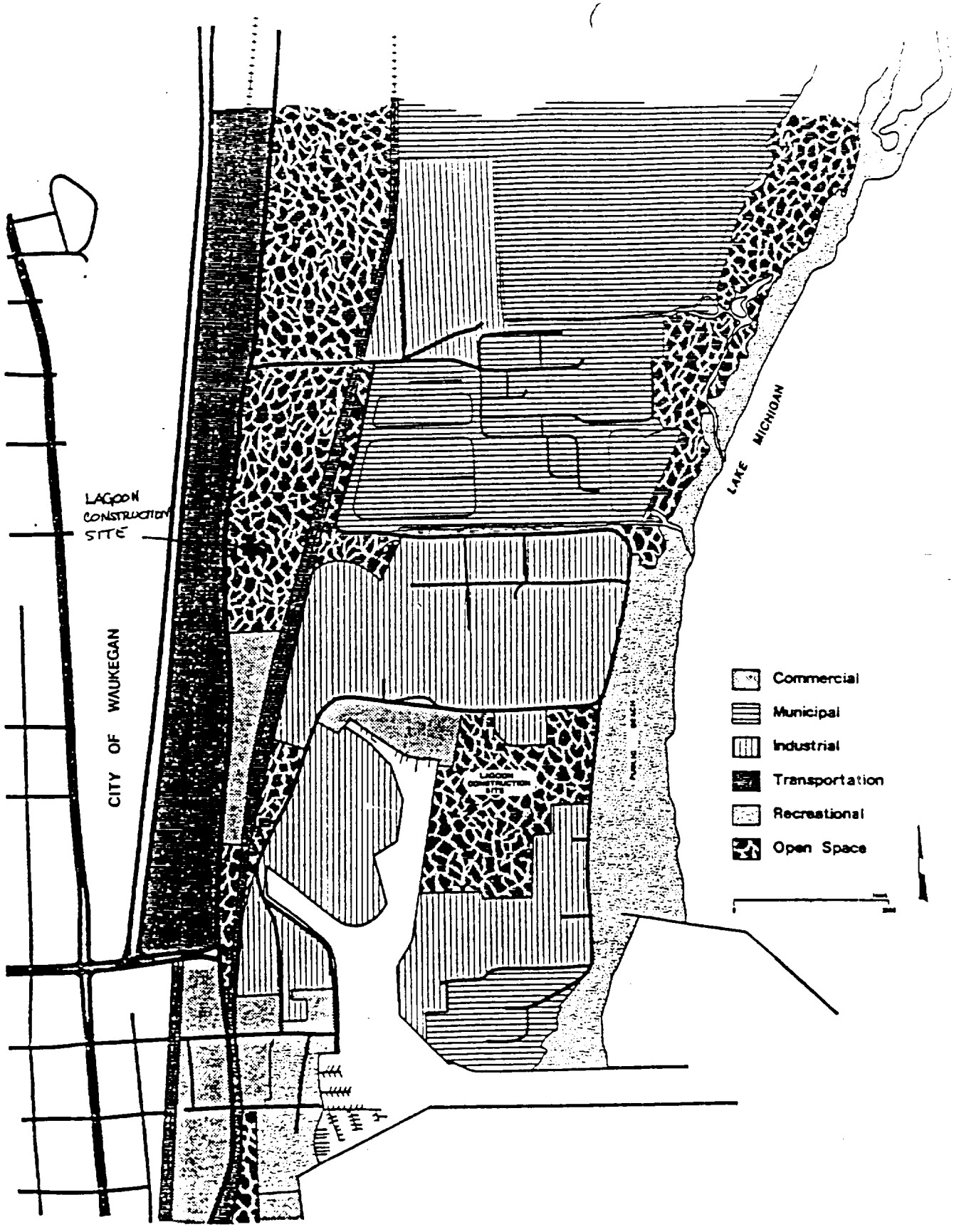
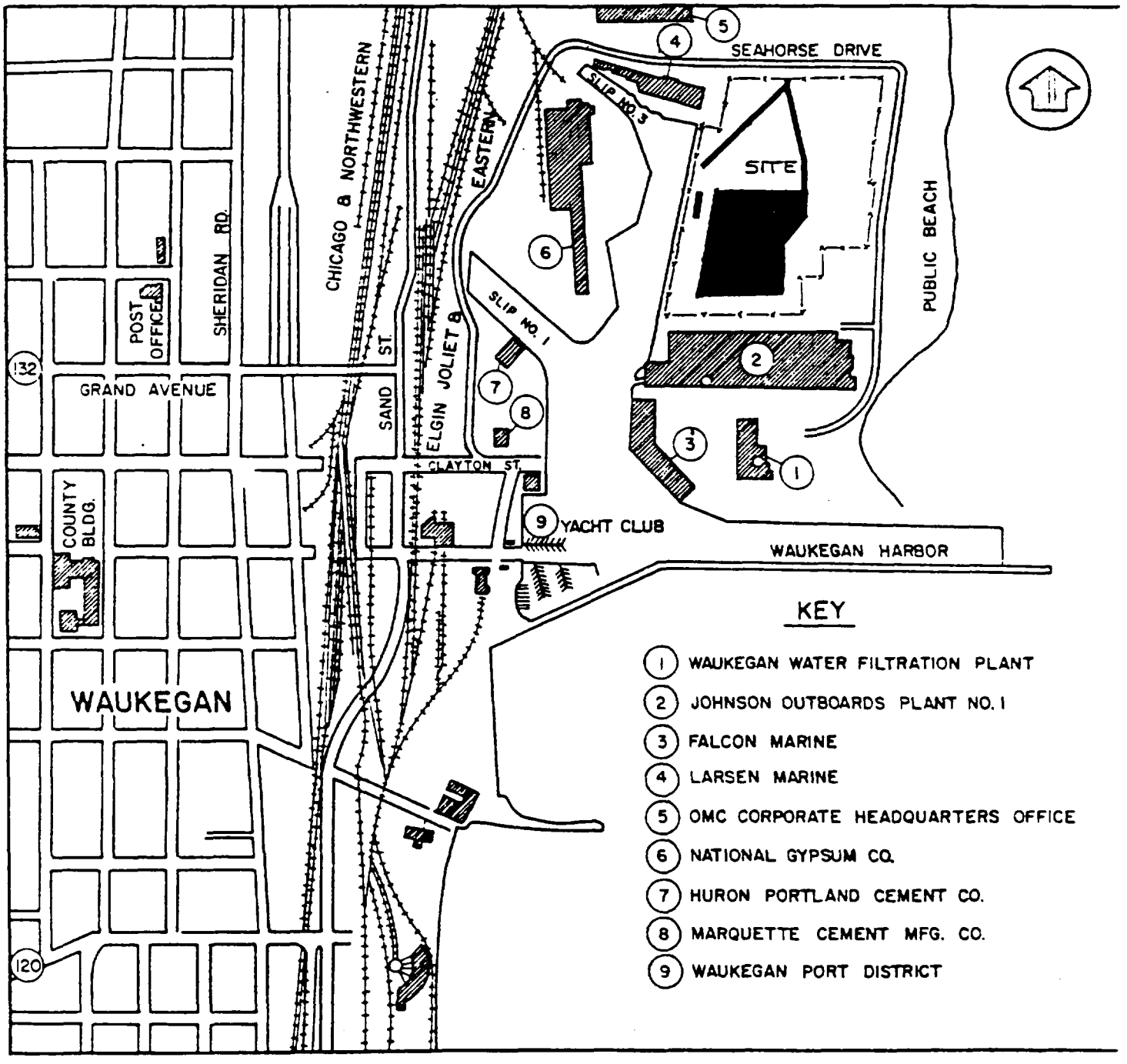


Figure 5 Land use in the vicinity of Waukegan Harbor, Waukegan, Illinois



LOCATION MAP

NO SCALE

PREFERRED ALTERNATIVE

FIGURE 6

1. 170,000 cubic yards of Harbor sediment are contaminated with PCB to levels in excess of 10 ppm (Zones 1, 2 and 3; Table 1). An estimated 359,000 pounds of PCBs are contained in these sediments (Mason and Hanger 1981).

2. PCB levels in model predictions indicate that Waukegan Harbor fish would drop to the FDA tolerance limit of 5 ppm or less if dredging would permanently reduce sediment PCB concentrations in Zone 1. It is not clear from the model if additional improvement in fish levels would be derived if further decreases in concentrations occur (HydroQual 1981).

3. Also, according to the model, a permanent reduction of the contaminated sediment levels in Zone 1 to below 50 ppm would reduce the transfer of PCBs to Lake Michigan to essentially zero (HydroQual 1981).

4. Dredging beyond Zone 1 is necessary to prevent recontamination from Zone 2 which contains sediment with PCB levels in excess of 50 ppm.

5. PCB levels in sediment fall below 50 ppm beyond Zone 2, just north of Slip #1 300 feet north of the navigation channel currently maintained by the Corps of Engineers (CoE). It is anticipated that the CoE will need to dredge the channel in coming years.

6. More than 99% of the 359,000 pounds of PCB is contained in 50,000 cubic yards of sediment in Zones 1 and 2 (Figure 1). The remaining mass of PCB is distributed throughout the 120,000 cubic yards in Zone 3.

7. The USEPA in _____ designated materials in excess of 50 ppm PCB as PCB items, requiring stringent constraints on their use, handling, storage and disposal. In _____, the _____court ordered USEPA to reconsider whether the 50 ppm level was sufficient to protect the environment.

8. Removal levels to 10 ppm - 50 ppm have been employed or are proposed for dredging or excavating for areas of contamination elsewhere in the United States (Hudson River, New York).

9. Data from other Great Lakes Harbors show that fish with PCB contamination levels below the FDA tolerance level are associated with sediment PCB concentrations generally less than the 10-50 ppm range. (USEPA 1981).

10. Laboratory bioassays of fish exposed to PCB contaminated sediment and water systems were contaminated to levels above the FDA tolerance levels when sediments greater than 10 ppm PCB's were utilized.

11. Since 1977, USEPA Region V has classified sediments contaminated with 10 ppm PCB or greater as unacceptable for open lake disposal.

The above considerations have lead USEPA to propose that Zones 1 and 2 be dredged in order to abate the Harbor PCB contamination problem.

Table 1 Extent of PCB Contamination in Waukegan Harbor

ZONE	Approximate Mass of PCBs (lbs)	Approximate Volume of Sediment (cubic yards)
1 (over 500 ppm PCB)	350,000	11,000
2 (50 to 500 ppm PCB)	7,000	39,000
3 (10 to 50 ppm PCB)	2,000	120,000
Remainder of Harbor	250	

Dredging

Zone 1 and 2 in the Harbor will be dredged using pneumatic or hydraulic dredging equipment. Silt curtains will be deployed in order to contain resuspended sediments, and a monitoring program and contingency plan will be executed in order to assure the success of the removal phase of the project. Details of the proposed dredging operation are described and evaluated in the Draft EIS.

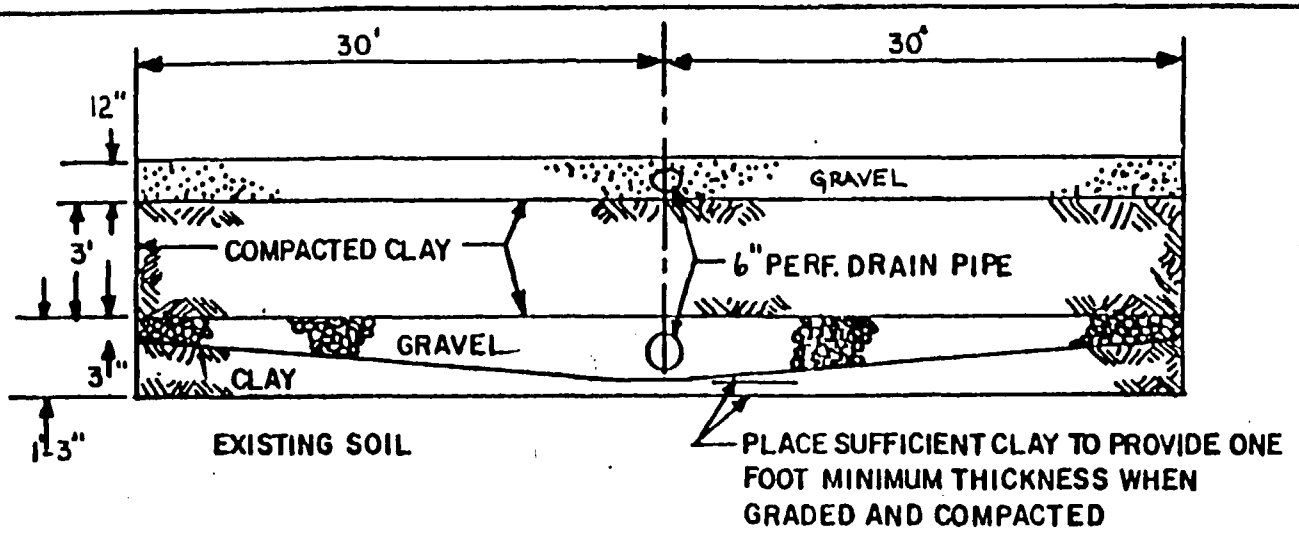
Dewatering Lagoon System

USEPA has determined that the removal project should include Zone 1 and 2 of the Harbor. The total volume of sediment to be removed in these areas is estimated to be approximately 50,000 cubic yards (Mason and Hanger 1981). Therefore, the dewatering lagoon should have a capacity of 100,000 cubic yards to provide for containment of the dredged material and entrained Harbor water prior to treatment.

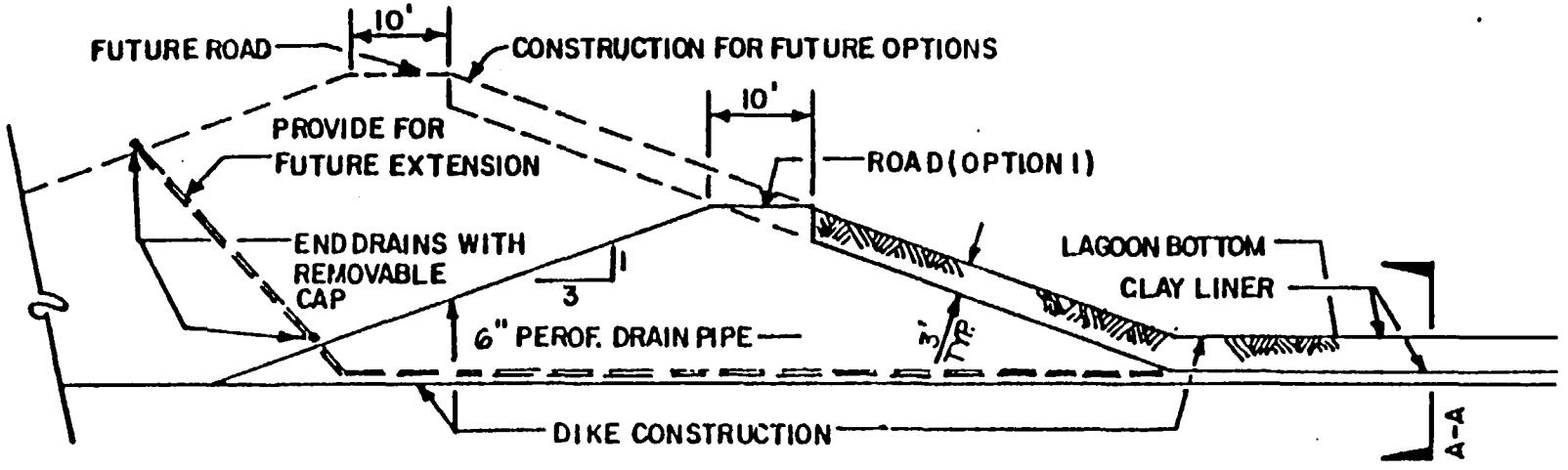
The construction of the proposed dewatering lagoon will utilize impermeable clay foundations (or liners) and a leachate collection system. The design is shown in Figure 7, section A-A (a cross-section through the bottom of the lagoon). There will be a one-foot clay liner above the existing ground and a leachate collection system above the liner. The leachate collection system will have perforated pipes located in a one-foot-thick gravel layer. Above the leachate collector will be three feet of impermeable clay which will be compacted during construction to achieve a permeability coefficient of not more than 1×10^{-7} cm/sec. The primary purpose of the leachate system is to provide safe leachate collection in case the upper-most clay liner fails. In addition, it can be used to test the integrity of the clay liner by analyzing the leachate for PCBs.

A one foot thick layer of gravel will be placed above the upper-most clay liner to facilitate final dewatering of sediments in the lagoon. Drainage systems in the gravel layer will be used to further reduce water content when settling is complete and overlying water has been pumped away for treatment.

The sides of the proposed lagoon will be diked and include a ramp for truck access. The design is shown in Figure 7, Section B-B. The diked sides will have a 3:1 slope for stability, and the dike will be constructed of soil material from off site. The three-foot clay liner will extend up the slope of the lagoon from its bottom and will be in contact with the contaminated sediments. The leachate collection system will extend through the dike walls to facilitate the collection of samples and the removal of any leachate collected.



SECTION A-A



SECTION B-B

FIGURE: 7 CROSS-SECTIONS OF LAGOON

NO SCALE

During the dredging operation, the bottom sediments will be slurried with Harbor water and transfered via pipeline to the dewatering lagoon. The sediment will be allowed to settle and the excess water treated to remove any dissolved PCBs.

Treatment will consist of:

- Settling of the sediments in the lagoon
- Pumping excess water and sending it into a smaller sedimentation basin where a polymer will be added to coagulate and settle fine sediment
- Pumping the sedimentation basin water through pressure filters to remove any additional suspended soilds
- Conveying filter effluent through carbon filters to remove PCBs and other organic material
- Conveying carbon filter effluent to a clear well (an effluent holding tank)

The water in the clear well will be monitored for PCB content before it is returned to the Harbor. A one part per billion (ppb) PCB effluent limitation will be maintained for water returned to the Harbor. Figure 8 illustrates the proposed treatment system. Rainwater and leachate water will be treated in essentially the same manner, except that the operation will be intermittent and the volume smaller.

Six groundwater monitoring wells will be installed around the periphery of the lagoon site to measure groundwater for PCB's, pH level, specific conductance and chlorinated organic compounds. As a precaution the monitoring well discharges will be collected and combined with leachate and rainwater, and then treated.

After the sediments have been dewatered and the excess water has been treated and discharged to Waukegan Harbor, the sediments will be removed to an approved permanent disposal facility. The Draft EIS will include a thorough evaluation of alternatives for ultimate disposal. Once all sediments have been removed, the lagoon and treatment facility will be dismantled, the clay foundation will then be disposed of at the same disposal site as the sediments. After all the contaminated materials have been removed, the site will be regraded to the same condition that existed prior to the construction of the dewatering lagoon except that the surface elevation will be several feet higher. The total life of the proposed project from commencement of construction of the dewatering lagoon to site restoration will be approximately five years.

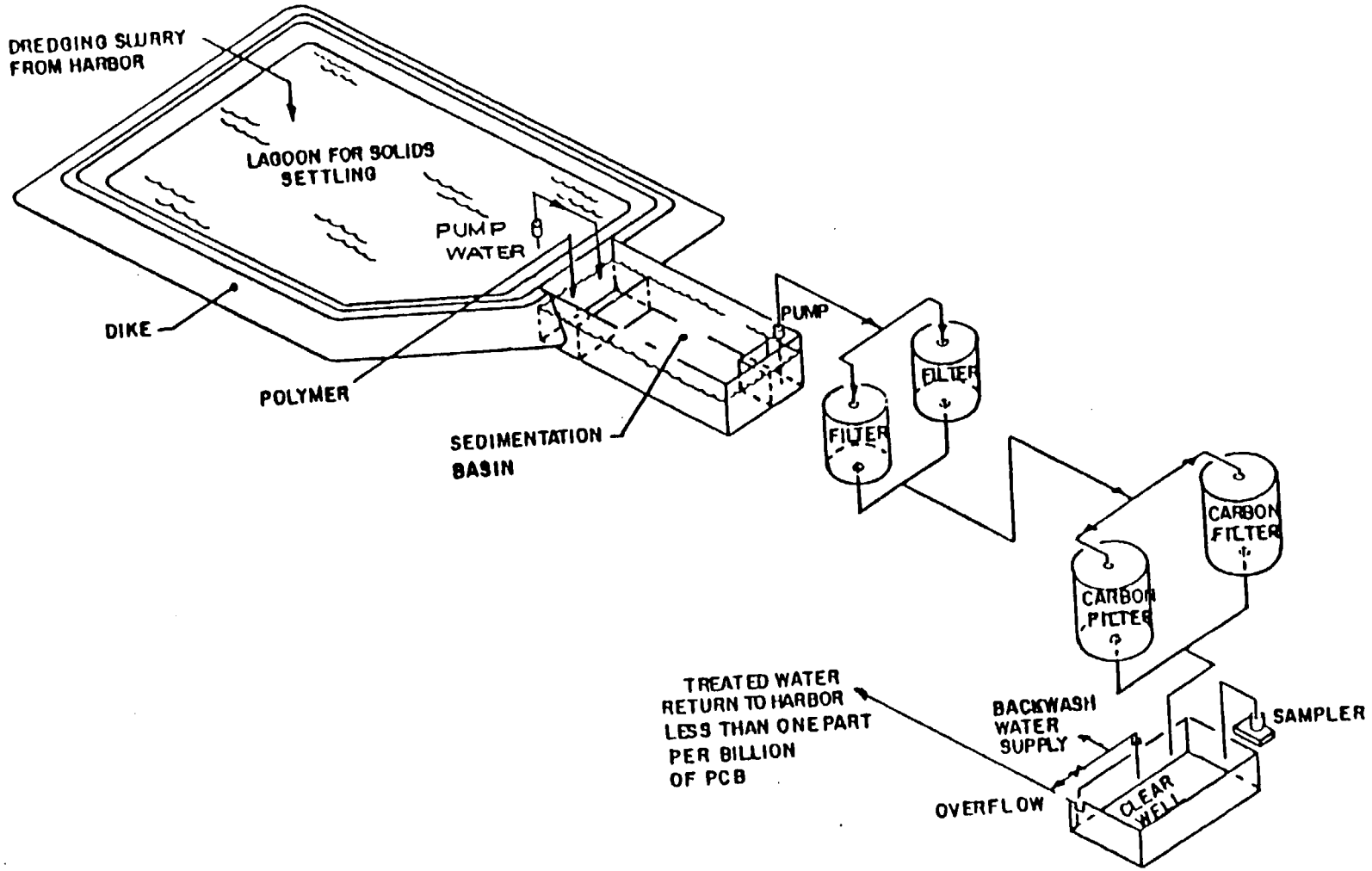


FIGURE 8

PROPOSED TREATMENT SYSTEM FOR EXCESS WATER

G. Environmental Consequences of the Proposed Project

Dredging

The potential impacts and mitigative measures to minimize impacts during actual operation of the dredging program will be addressed in the Draft EIS.

Dewatering Lagoon System

Noise

The construction of the dewatering lagoon and treatment facility will impact the immediate area surrounding the vacant OMC land.

Community noise levels are commonly expressed as a 24-hour average measurement which is adjusted to represent noise levels during day and night time conditions. Table 2 presents the typical measured human response associated with various noise levels in decibels (dBA).

The proposed lagoon construction activities will ultilize heavy equipment such as trucks, bulldozers, compactors, generators, backhoes and other earth moving equipment. Noise levels measured in dBA at a distance of 50 feet for various consruction equipment are presented in Table 3. Lagoon construction is scheduled to begin in March 1982 and be completed in September 1982 during which period an increase in noise levels can be expected.

The construction period is relatively short term, therefore, no long-term irreversible impacts are expected. However, short term noise impacts may be encountered by users of the public beach 1000 feet east of the site. Mitigating measures such as proper maintenance of muffler systems on construction equipment so that emitted noise is within a reasonable range and curtailing the hours of operation should mitigate any short-term adverse impacts.

Dust

Construction of the dewatering lagoon will generate fugitive dust at the construction site and along roads leading to and from the site. The area impacted would depend upon local wind direction and velocity. Normally, the wind blows from the lake toward the land during the day. Therefore, the areas west of the site may be most vulnerable to impact from dust, while the surrounding area to the north and south may experience occasional dust impacts as the wind shifts to those directions.

Sensitive receptors west of the construction site include the National Gypsum Co. (approximately 500 feet across the Harbor between Slips #1 and #3) and Larsen Marine. The area near a potential haul road which may be strongly impacted is the parking lot. The public beach on Lake Michigan is east of the site and is not expected to be significantly impacted based on past data concerning daytime wind conditions. The Harbor, boat launching and breakwater areas south of the site are also sensitive receptors, and will also experience fugitive dust impacts (Figure 9).

The major impact from dust will be a nuisance problem as the dust may coat cars in parking lots and boats at Larsen Marine. Fugitive dust generated by construction activities is a short-term reversible impact and will be minimized with proper controls, including the use of street sweeping equipment on paved roads, and wetting the paved and unpaved roads and construction areas.

TABLE 2
WEIGHTED SOUND LEVELS AND HUMAN RESPONSE

Sound Source	dBA	Trend of Response
	130	Painfully loud. Limit amplified speech.
Jet takeoff at 200 feet	120	Maximum vocal effort
Discotheque, Riveting Machine	110	
Jet takeoff at 2,000 feet Shout (0.5 feet)	100	Very annoying
Heavy diesel truck at 50 feet	90	
Food blender Garbage disposal Loud radio or hi-fi	80	Annoying
Freight train at 50 feet Cash register	70	Complaining possible
Typical large store Automobile (average) 35-40 mph Air conditioning unit at 20 feet	60	
Residence		Acceptance
Quiet conference room	50	Quiet
Living room	40	
Bedroom Whisper at 5 feet	30	Very quiet
Rustling of leaves, broadcast studio	20	
	10	Just audible
Faintest possible sound	0	Threshold of hearing

Table 3 Measured noise levels of construction equipment (USEPA 1971).

Equipment	Noise Level (in dBA at 50 feet)	Equipment Noise Sources[1] (in order of importance)
Earthmoving		
Front-end loaders	79	E C F I H
Backhoes	85	I C F I H
Dozers	80	E C F I H
Tractors	80	E C F I W
Scrapers	88	E C F I W
Graders	85	E C F I W
Trucks	91	E C F I T
Pavers	89	E C F I
Stationary		
Pumps	76	E C
Generators	78	E C
Compressors	81	E C H I
Impact		
Pile drivers	101	W P E
Jackhammers	88	P W E C
Rock drills	98	W E P
Pneumatic tools	86	P W E C
Other		
Saws	78	W
Vibrators	76	W E C

[1] Sources:

C - Engine Casing
E - Engine Exhaust
F - Cooling Fan
H - Hydraulics
I - Engine Intake
P - Pneumatic Exhaust
T - Power Transmission Systems, Gearing
W - Tool-Work Interaction

Truck tires will also be cleaned before departing staging areas. The construction contractor, as directed by EPA's On Scene Coordinator, will be responsible to see that nuisance dust conditions are mitigated.

Erosion

Erosion can result when earth moving or excavation takes place in an area with rolling terrain. Soil erosion on the site area also is a concern because of the potential for storm water to carry soil into the Harbor or Lake Michigan. The proposed site for the dewatering lagoon is generally level and it is expected that erosion will not be a problem. Proper excavation techniques will be used to minimize any potential erosion. Once construction is completed, the area outside the lagoon will be graded and seeded by the contractor so that runoff will be minimized.

Road Maintenance

The capability of roads leading to the lagoon site to sustain the loads imposed by clay and earth hauling trucks is of some concern. The contractor will be required to repair any road damages that are attributed to this project and will also reduce truck haul volumes if necessary.

Aesthetics

The proposed lagoon site was formerly the site of a coke foundry and there is a possibility that site clearing will reveal demolition rubble that contains scrap metal and foundry sand as well as unknown materials. The contractor will be prepared to transport such materials, if found, to a suitable disposal facility. An effort will be made to minimize the stockpiling of debris or construction materials on the vacant land adjacent to the public beach. Such measures will lessen aesthetic impacts to the beach area which is 1,000 feet east of the proposed site.

Lagoon construction requires the transportation via truck of excavated and fill materials to and from the site. This truck traffic will adversely impact the nature of the public beach and surrounding areas and will also disrupt traffic patterns. However, an attempt will be made to minimize traffic congestion during the construction period. The optimum schedule for construction and truck traffic have been estimated based on the following assumptions:

- A total of 200,000 cubic yards (cu. yd.) of material must be moved
- 1200 cu.yd. of materials can be moved per 8 hour shift
- A work day will consist of 16 hours
- A work week will consist of 7 days
- Truck capacity of 12 cu. yd.

Based on these assumptions, an estimated 13 truck trips per hour for 16 hours per day for 7 days per week will occur during the construction of the lagoon. If these optimum condition are adhered to, construction of the lagoon will take approximately 12 weeks.

The adverse impact of truck traffic cannot be totally mitigated. However, those impacts will be short term, lasting only 4-6 months.

Endangered and Threatened Species

The United States Fish and Wildlife Service lists no known species as endangered or threatened pursuant to 50 CFR § 17.11 and no known critical habitats of such species designated under 50 CFR 17.95 that are likely to be jeopardized by the construction of the dewatering lagoon. The State of Illinois has however listed the Common Tern as endangered.

A colony of Common Terns is known to breed at the Commonwealth Edison power plant directly north of the proposed dewatering lagoon site. Construction of the dewatering lagoon will not impact the breeding habitat of the Common Tern. It is possible, that noise and dust arising from lagoon construction may disturb the terns and prevent them from feeding in or near the Harbor. This will not impact the terns since terns can feed most anywhere along the shore of Lake Michigan.

Recreational

There are no wetlands, prime farmlands, sand dunes, or other environmentally sensitive features on the proposed project site. The possible exception is the public beach east of the proposed site. The beach is a major recreational resource for Waukegan and surrounding areas. The City of Waukegan uses the beach for a series of festivals held throughout the summer. The five festivals scheduled for 1981 are expected to attract between 70,000 and 80,000 people. There are only 250 public parking places available at the beach. For its festivals, the City has an informal arrangement with OMC to use a portion of the proposed lagoon site for parking. Approximately 2,500 cars can be accommodated on the portion of the lot for parking. Construction of a dewatering lagoon on the vacant lot will directly impact the City's ability to use the land for parking. Alternative parking facilities may be available but they will be located further from the beach. Unused portions of the lagoon site may also be potentially available for parking after construction is completed.

Land Use Impacts

The dewatering lagoon is proposed to be located on vacant OMC property bordering the eastern edge of the Harbor. The site is bordered by Waukegan Harbor and Larsen Marine on the west, Sea Horse Drive and OMC Corporate Headquarters on the north, the Waukegan public beach and the OMC data processing center on the east, and the Johnson Outboard Plant No. 1 on the south (Figure 9). This vacant land encompasses approximately 23 acres. The dewatering lagoon and treatment facility will require approximately half of the site (Figure 9). Also located on the western margin of the site is a pile of dredge spoils from the mouth of the Harbor channel and contaminated with relatively low levels of PCBs. This material may be used in constructing the dewatering lagoon. The site at present is used for summer storage of boat cradles used by Larsen Marine for winter boat storage. The empty wooden cradles are stacked on the northwest portion of the site. The cradles are moved into the fenced area around Larsen Marine during the winter and used to hold boats for winter storage. No boats are stored outside the fenced area around Larsen Marine during the winter. With the exception of the berm on the Harbor side of the property, this land is level. There are no unique vegetation or natural features on the site.

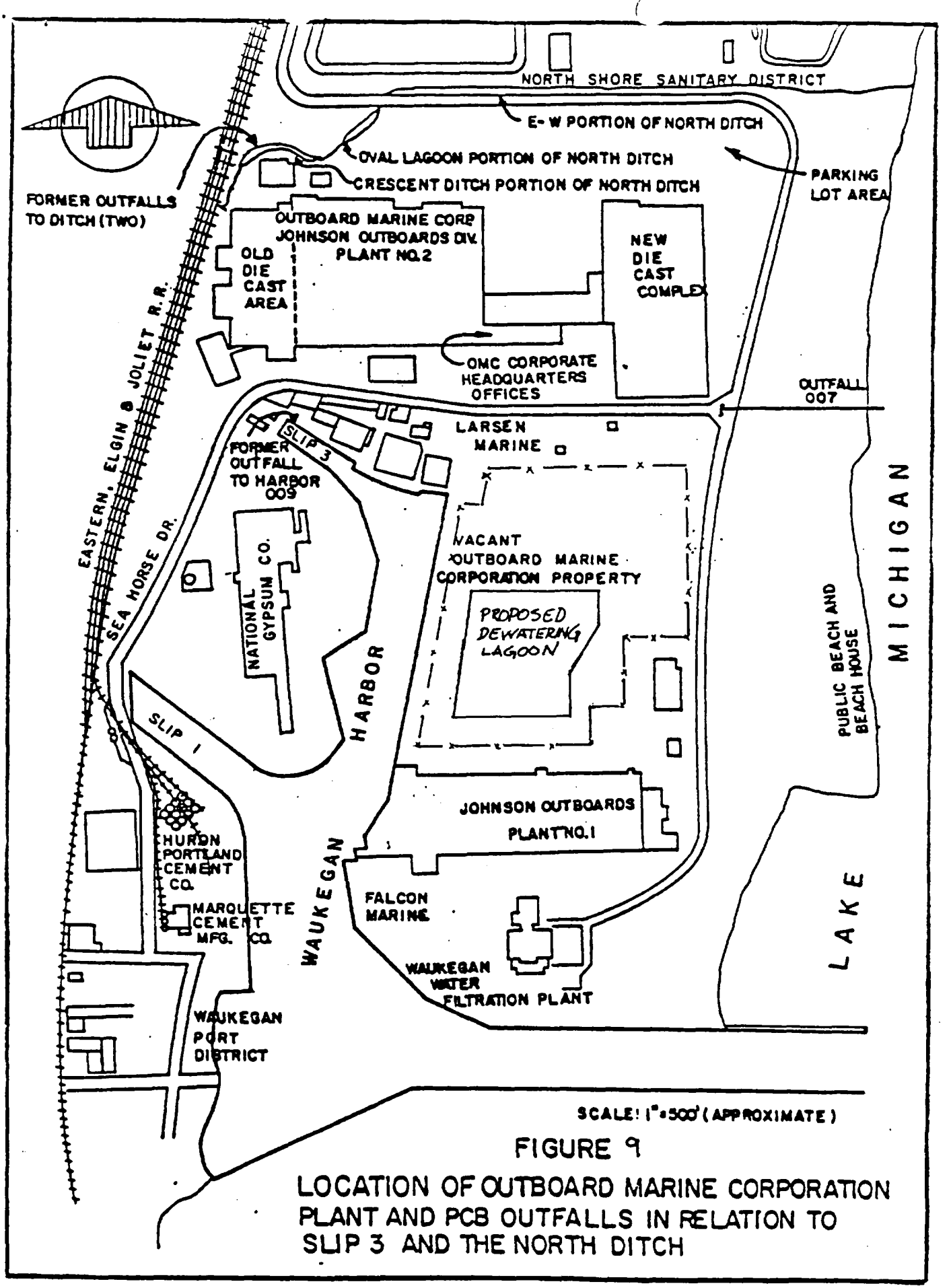


FIGURE 9

LOCATION OF OUTBOARD MARINE CORPORATION PLANT AND PCB OUTFALLS IN RELATION TO SLIP 3 AND THE NORTH DITCH

If the dewatering lagoon and treatment facility were constructed on the proposed OMC vacant property, OMC would be precluded from utilizing the 23 acres for the five years necessary to dredge Waukegan Harbor and dispose of the sediments. This will directly impact any land use OMC might have comtemplated with respect to this site. Larsen Marine should not be impacted since their activities do not extend into the project area.

An 8-inch sanitary sewer traverses the site but it will not be directly impacted by construction of the dewatering lagoon. As a precaution, a sanitary sewer force main will be placed parallel to the existing pipe. This force main will only be utilized if the existing sanitary sewer should fail.

H. Conclusions

After evaluating all alternatives for abating the Waukegan Harbor PCB contamination problem, including no action, USEPA recommends that the PCB contaminated sediments in Waukegan Harbor be removed via a hydraulic or pneumatic dredge technique and then disposed of in an approved permanent disposal facility. USEPA has determined that the necessary dewatering lagoon system should be constructed adjacent to Waukegan Harbor on a vacant parcel of land owned by OMC (Figure 6). USEPA has decided that approximately 50,000 cubic yards of sediment contaminated with PCB concentrations greater than 50 ppm should be removed from Zones 1 and 2 of Waukegan Harbor (Figure 1).

The primary impacts associated with the dewatering lagoon construction are dust, noise, erosion and possible road destruction. These impacts are short-term and mitigative measures will be implemented, allowing the dewatering lagoon to be constructed in an environmentally acceptable manner.

USEPA's Draft EIS will assess the alternative methods of actual operation of the dredging equipment, operation of the dewatering lagoon, analysis of alternatives for the PCB contaminated North Ditch and adjacent parking lot areas, and the method of disposal of PCB contaminated sediments removed in the course of the project. Recommendations on these aspects of the project will not become final until the Final EIS has been distributed to the public and our Record of Decision is published in April, 1982.

I. Literature Cited

USEPA, Central Regional Laboratory. March 1979. Outboard Marine Corporation Biological Studies Report.

USEPA, Central Regional Laboratory. 1978 and 1979. The Analysis for PCB in Fish Collected in Waukegan Harbor.

USEPA, Great Lakes National Program Office. March 17, 1981. Memorandum from Jim Clark to Howard Zar. Analysis of Fish Samples from Waukegan Harbor

USEPA, Central Regional Laboratory. December, 1979. Waukegan Harbor Bioconcentration and Depuration Study June 19, 1979-October 10, 1979.

Veith, Gilman D. July 15, 1980. Uptake and Elimination of PCBs in Fish Contaminatid by Waukegan Harbor.

USEPA, Region V. November 24, 1980. A Status Report. The PCB Contamination Problem. Waukegan, Illinois.

USEPA, Region V. January 21, 1981. The PCB Contamination Problem in Waukegan, Illinois.

Illinois Environmental Protection Agency. May 9, 1980. A Letter from Mr. Gary King to Ms. Kaye Jacobs Conveying a Copy of PCB influent and effluent data compiled by OMC for its Waukegan Facility.

Environmental Research Group, Inc. June 1979. Sampling and Analysis of Water and Sediment Samples Taken from Waukegan Harbor Before, During, and After Maintenance Dredging.

Illinois Department of Conservation. March 1981. Sport Fishing Creel Survey on the Illinois Portion of Lake Michigan.

St. Amant, J. R. and Sheffy, T. B. September, 1980. Wisconsin Department of Natural Resources Toxic Substances Survey of Lake Michigan, Superior and Tributary Streams: First Annual Report.

Illinois Department of Conservation. March, 1981. The 1980 Charter Boat Sport Catch in the Illinois Waters of Lake Michigan.

USEPA, Large Lakes Research Station, Grosse Ile, Michigan. January, 1981. Modeling of Episodic Transport Events Ocurring in Waukegan Harbor.

Harrison, Wyman. October 15, 1979. Argonne National Laboratory. Argonne Waukegan Harbor Study, Spring and Summer, 1979.

Argonne National Laboratory. March 5, 1979. Argonne Final Letter Report, Argonne Waukegan Harbor Study, December 1978.

Dawson, G. W. and Goodier, J. L. 1978. Bartelle, Pacific Northwest Laboratories. Evaluation of Alternatives for Removal/Destruction of PCB-Contaminated Sediments in Waukegan Harbor.

Warzyn Engineering, Inc. September, 1979. Hydrologic Investigation, Outboard Marine Corporation, Waukegan, Illinois.

Kontaxis, Michael T. and Thomann, Robert V. February, 1981. Hydroqual, Inc. Mathematical Modeling Estimate of Environmental Exposure Due to PCB-Contaminated Harbor Sediments of Waukegan Harbor and North Ditch.

Smith, Elliott. December 17, 1979. Cranbrook Institute of Science. Dry Weight Results of Particle Sampling at Waukegan During May and June, 1979.

USEPA, Region V. Waukegan Harbor Corps of Engineers Dredging History.

Armstrong, David E. June, 1979. Report on PCBs in Sediment Samples from Waukegan Harbor and Southern Lake Michigan.

Armstrong, David E. July, 1980. Final Report on Sediment Sampling, Water Sampling and PCB Analysis in Lake Michigan.

Environmental Research Group, Inc. August, 1979. Report, Sampling and Analysis of Sediment Samples Taken from Waukegan Harbor.

Environmental Research Group, Inc. October, 1979. Sampling and Analysis of Soil Samples Taken from Waukegan Harbor.

JRB Associates, Inc. February 10, 1981. OMC Technical and Witnessing Case Support Hydrological Study of Groundwater Final Report.

Mason and Hanger-Silas Mason Co. January, 1981. An Engineering Study for the Removal and Disposition of PCB Contamination in the Waukegan Harbor and North Ditch at Waukegan, Illinois and Addendum to Final Report, May, 1981.

McNaught, Donald C., Ph.D. September 8, 1981. Affected Environments: The Plankton.

Pojasek, Robert B. 1977. Toxic and Hazardous Waste Disposed Volume 1-4.

Barnard, William D. August, 1978. Prediction and Control of Dredge Material Dispersion Around Dredging and Open Water Pipeline Disposal Operations Technical Report D.S.-78-13

National Research Council, 1979. Polychlorinated Biphenyls. Committee on the Assessment of PCBs in the Environment. Washington, D.C., National Academy of Sciences

USEPA, Industrial Environmental Research Laboratory, Cincinnati, Ohio. January 16, 1981, PCB Degarding Microbes.

USEPA, RSKERL Ada, Oklahoma, December 2, 1980
"PCB-Feeding" Microorganisms of Clean Flo Laboratories

Versar, Inc. May, 1979. Polychlorinated Biphenyls 1929-1979 Final Report. USEPA Office of Toxic Substances Washington, DC